CLAIMS

1. Cooling system for an automotive drive unit, in particular for a drive unit such as an internal combustion engine situated in a rear end of a vehicle with a respective transmission, comprising a covering panel part situated beneath the drive unit as part of a covering undercarriage of a vehicle superstructure, wherein a warmer air layer zone formed on an engine side is layered above oncoming air supplied to a transmission case through air inlets in the covering panel part of the undercarriage, forming a cold air layer zone, and wherein a temperature interface develops between the cold air and the warmer air layer zones, temporarily running approximately in an area of an upper border of the transmission case and through a lower partial area of an engine housing which is connected to the transmission case.

2. Cooling system as claimed in Claim 1, wherein the air inlets are provided on a front side, as seen in a direction of travel, beneath the transmission case in the covering panel part of the undercarriage, and wherein air outlet openings are provided at the rear beneath the engine housing in an installation space.

3. Cooling system as claimed in Claim 2, wherein the air inlets are provided in a front area beneath the transmission case over a large area in the

covering panel part, and wherein the air outlet openings are provided in a rear area of the engine housing.

4. Cooling system as claimed in Claim 1, wherein at least one additional air inlet opening, defining an oncoming flow channel, is provided behind the air inlets, as seen in a direction of travel, in the covering panel part of the undercarriage, and is directed at a differential of the transmission.

5. Cooling system as claimed in Claim 1, and further comprising a scavenging air blower provided for the engine at the top in an installation space, and wherein said scavenging air blower has a compressed air inlet supply which acts upon the warmer air layer zone.

6. Cooling system as claimed in Claim 2, wherein the cold air layer zone can be enlarged as a function of the driving speed of the vehicle and can increase in size upward due to air flowing into the installation space through the air inlets, displacing the hot air layer zone upward, and wherein an outward flow of hot air on the engine side through the air outlet openings can be achieved.

7. A process of operating a cooling system for an automotive drive unit, in particular for a drive unit such as an internal combustion engine situated in a rear end of a vehicle with a respective transmission, the system having a covering panel

part situated beneath the drive unit as part of a covering undercarriage of a vehicle superstructure, comprising forming a warmer air layer zone on an engine side above oncoming air supplied to a transmission case through air inlets in the covering panel part of the undercarriage, forming a cold air layer zone, and developing a temperature interface between the cold air and the warmer air layer zones, temporarily running approximately in an area of an upper border of the transmission case and through a lower partial area of an engine housing which is connected to the transmission case.

8. The process as claimed in Claim 7, wherein the air inlets are provided on a front side, as seen in a direction of travel, beneath the transmission case in the covering panel part of the undercarriage, and wherein air outlet openings are provided at the rear beneath the engine housing in an installation space.

9. The process as claimed in Claim 8, wherein the air inlets are provided in a front area beneath the transmission case over a large area in the covering panel part, and wherein the air outlet openings are provided in a rear area of the engine housing.

10. Cooling system as claimed in Claim 7, wherein at least one additional air inlet opening, defining an oncoming flow channel, is provided behind the air

inlets, as seen in a direction of travel, in the covering panel part of the undercarriage, and is directed at a differential of the transmission.

11. The process as claimed in Claim 7, wherein a scavenging air blower is provided for the engine at the top in an installation space, and wherein said scavenging air blower has a compressed air inlet supply which acts upon the warmer air layer zone.

12. The process as claimed in Claim 8, wherein the cold air layer zone can be enlarged as a function of the driving speed of the vehicle and can increase in size upward due to air flowing into the installation space through the air inlets, displacing the hot air layer zone upward, and wherein an outward flow of hot air on the engine side through the air outlet openings can be achieved.

13. A vehicle including a cooling system and an automotive drive unit situated in a rear end of the vehicle comprising:

a transmission with a transmission case, and

a covering panel part situated beneath the drive unit as part of a covering undercarriage of a vehicle superstructure,

wherein a warmer air layer zone formed on an engine side is layered above oncoming air supplied to the transmission case through air inlets in the covering panel part of the undercarriage, forming a cold air layer zone, and

wherein a temperature interface develops between the cold air and the warmer air layer zones, running approximately in an area of an upper border of the transmission case and through a lower partial area of a drive unit housing which is connected to the transmission case.

14. The vehicle as claimed in Claim 13, wherein the air inlets are provided on a front side, as seen in a direction of travel, beneath the transmission case in the covering panel part of the undercarriage, and wherein air outlet openings are provided at the rear beneath the drive unit housing in an installation space.

15. The vehicle as claimed in Claim 14, wherein the air inlets are provided in a front area beneath the transmission case over a large area in the covering panel part, and wherein the air outlet openings are provided in a rear area of the drive unit housing.

16. The vehicle as claimed in Claim 13, wherein at least one additional air inlet opening, defining an oncoming flow channel, is provided behind the air inlets, as seen in a direction of travel, in the covering panel part of the undercarriage, and is directed at a differential of the transmission.

17. The vehicle as claimed in Claim 13, and further comprising a scavenging air blower provided for the drive unit at the top in an installation space,

wherein said scavenging air blower has a compressed air inlet supply which acts upon the warmer air layer zone.

18. The vehicle as claimed in Claim 14, wherein the cold air layer zone can be enlarged as a function of the driving speed of the vehicle and can increase in size upward due to air flowing into the installation space through the air inlets, displacing the hot air layer zone upward, and wherein an outward flow of hot air on the drive unit side through the air outlet openings can be achieved.

19. A process of cooling an automotive drive system mounted in a rear of a vehicle by way of air inlet openings provided in a covering panel part of an undercarriage, comprising:

creating, through an influx of air, a cold air layer zone around a transmission and a bottom of an engine, and

displacing a hot air layer zone of the engine, which is located above the cold air layer zone, outward through air outlets.